IN THE CLAIMS:

1. (Currently Amended) A method of operating a fuel cell having an anode, a water-repellant cathode, a proton exchange electrolyte membrane interposed between the anode and cathode, and a separator having grooves formed in one surface thereof, said grooves extending straight continuously in completely spanning the one surface between opposing first and second ends thereof, the one surface being in contact with said cathode with said grooves open to and closed by said cathode, said method comprising:

providing the cathode in the form of a carbon cloth in which PTFE is embedded;

providing a film of a platinum group catalyst on a surface of the cathode facing the electrolyte membrane;

supplying a first gas including hydrogen gas to the anode via a first gas flow passage;

supplying a second gas including an oxidizer to the cathode via a second gas flow passage inclusive of the grooves and separate from said first gas flow passage; and

spraying liquid water from at least one spray nozzle into the first ends of said grooves, into contact with a surface of said cathode and, in liquid state, out the second ends, thereby maintaining said electrolyte membrane in a moist condition, said water-repellency preventing water deposition on the cathode which would decrease the

effective surface area of the cathode.

2. (Original) A fuel cell operating method according to claim 1 further comprising detecting an output voltage of the fuel cell and controlling a quantity of water sprayed in response to the detected output voltage.

3. (Original) A fuel cell according to claim 1 further comprising calculating an optimum quantity of spray water as that quantity of spray water determined to maintain a proper moisture content within the electrolyte membrane and controlling the liquid water sprayed to provide the calculated optimum quantity of liquid water onto the surface of said cathode.

4. (Previously Presented) A fuel cell operating method according to claim 15 wherein said spraying is intermittent.

5. (Previously Presented) A fuel cell operating method according to claim 15 wherein the liquid water is sprayed directly onto the surface of said cathode.

6. (Previously Presented) A fuel cell operating method according to claim 15 wherein the liquid water is dispersed over the entire surface of the cathode.

7. (Original) A fuel cell operating method according to claim 1 further comprising calculating an optimum quantity of spray water as that quantity of spray water determined to maintain temperature of the fuel cell within a predetermined temperature range and controlling the spraying to spray the calculated optimum quantity of liquid water onto the surface of the cathode.

8. (Original) A fuel cell operating method according to claim 1 further comprising detecting power output of the fuel cell and controlling quantity of water sprayed responsive to the detected power output.

9. (Previously Presented) A fuel cell operating method according to claim 15 further comprising detecting power output of the fuel cell, calculating an optimum quantity of spray water based on the detected power output, and controlling the spraying to spray the calculated optimum quantity of liquid water onto the surface of the cathode.

10. (Previously Presented) A fuel cell operating method according to claim 15 wherein the water is sprayed at a predetermined constant pressure over a predetermined time interval.

11. (Original) A fuel cell operating method according to claim 1 wherein the electrolyte membrane has a thickness allowing water produced by fuel cell reaction at the cathode

to permeate through the membrane toward the anode.

12. (Previously Presented) A fuel cell operating method according to claim 15 further comprising:

separating liquid water from gas exiting the second ends of the grooves.

13. (Original) A fuel cell operating method according to claim 12 further comprising recirculating the separated liquid water to the spray nozzle.

14. (Original) A fuel cell operating method according to claim 15 ~~1~~ wherein said grooves are vertically oriented, said first ends are upper ends, and said second ends are lower ends, whereby said supplied water falls by gravity in traversing the grooves.

15. (Previously Presented) A method of operating a fuel cell having a solid polymer electrolyte membrane interposed between an anode and a cathode and a separator arranged opposed to the anode or the cathode and including a flow passage for supplying gas, comprising:

providing the cathode with water repellency, said cathode being in the form of a carbon cloth with embedded PTFE; and

supplying liquid water through the flow passage to the cathode, vaporization of the water in the flow passage of the separator preventing moisture in the electrolyte

membrane from vaporizing to keep the electrolyte membrane in a moist condition.

16. (Previously Presented) A fuel cell operating method according to claim 15 further comprising detecting an output voltage of the fuel cell and controlling a quantity of water sprayed in response to the detected output voltage.

17. (Previously Presented) A fuel cell according to claim 15 further comprising calculating an optimum quantity of spray water as that quantity of spray water determined to maintain a proper moisture content within the electrolyte membrane and controlling the liquid water sprayed to provide the calculated optimum quantity of liquid water onto the surface of said cathode.

18. (Previously Presented) A fuel cell operating method according to claim 15 further comprising calculating an optimum quantity of spray water as that quantity of spray water determined to maintain temperature of the fuel cell within a predetermined temperature range and controlling the spraying to spray the calculated optimum quantity of liquid water onto the surface of the cathode.

19. (Previously Presented) A fuel cell operating method according to claim 15 further comprising detecting power output of the fuel cell and controlling quantity of water sprayed responsive to the detected power output.

20. (Currently Amended) A fuel cell operating method according to claim 15 ~~1~~ wherein the electrolyte membrane has a thickness allowing water produced by fuel cell reaction at the cathode to permeate through the membrane toward the anode.